

## CLAIMS

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1. A catalyst on support for the selective oxidation of sulfur-containing compounds to elemental sulfur, comprising at least one catalytically active material that is present on a support material, wherein the catalytically active material consists at least partly of a mixed oxide with an oxidic lattice, in which at least two metals in the form of ions are included.

5 2. A catalyst according to claim 1, wherein the first metal is capable of changing its valence under the conditions of said selective oxidation.

10 3. A catalyst according to claim 2, wherein iron is used as the first metal.

15 4. A catalyst according to claims 1-3, wherein the second metal cannot, or only difficultly, change its valence under the conditions of said selective oxidation.

5 5. A catalyst according to claim 4, wherein as second metal, zinc, cerium, antimony, tin and/or germanium, more particularly zinc, is used.

20 6. A catalyst according to claims 1-5, wherein the atomic ratio of the first and the second metal is between 25/75 and 97.5/2.5, more particularly between 95/5 and 50/50.

25 7. A catalyst according to claims 1-6, which catalyst has a specific surface area of more than 20 m<sup>2</sup>/g, preferably more than 25 m<sup>2</sup>/g, and an average pore radius of at least 100 Å, while the catalyst exhibits substantially no activity for the Claus reaction under the reaction conditions.

8. A catalyst according to claims 1-7, characterized in that the support material is SiO<sub>2</sub>.

30 9. A catalyst according to claims 1-8, characterized in that the catalytically active material is present on the support in an amount of 0.1-50% by weight, calculated on the total mass of the catalyst.

10. A method for the preparation of a catalyst according to one or more of claims 1-9, comprising applying compounds of at least two metals to the surface of a support material, followed by drying and calcination of the support material, while during the calcination an amount of halogenide is present on the support material.

5 11. A method according to claim 10, wherein the support material is impregnated with one or more solutions of said metal compounds, and during or after the 10 impregnation an amount of chloride, for instance ammonium chloride, is applied to the surface of the support material.

12. A method according to claim 10 or 11, wherein the amount of chloride is between 0.1 and 20% by weight, based on the amount by weight of the metals.

15 13. A method for the selective oxidation of sulfur-containing compounds, in particular hydrogen sulfide, to elemental sulfur, characterized in that a hydrogen sulfide-containing gas together with an oxygen-containing gas is passed at an elevated temperature over the catalyst according to one or more of claims 1-9.

20 14. A method according to claim 13, characterized in that the molar ratio of oxygen to oxidizable sulfur compounds is maintained between 0.5 and 25.

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